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PATENT ABSTRACTS OF JAPAN

(11)Publication number : 09-199758
(43)Date of publication of application : 31.07.1997

(51)Int.Cl. H01L 33/00
H01L 21/205

(21)Application number : 08-007298
(22)Date of filing : 19.01.1996

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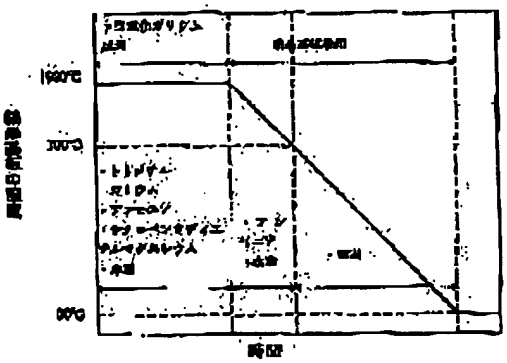
(54) VAPOR GROWTH METHOD OF LOW-RESISTANCE P-TYPE GALLIUM NITRIDE-BASED COMPOUND SEMICONDUCTOR

(57)Abstract:
PROBLEM TO BE SOLVED: To provide a p-type gallium nitride-based compound with high crystal quality and low resistance without using an additional step in a vapor growth method suitable for mass product, by cooling a substrate crystal at a given temperature in atmosphere of carrier gas excluding hydrogen just after the crystal is grown in the vapor.growth step.
SOLUTION: A crystal substrate including p-type gallium nitride has a temperature of 1030° C at a crystal growth step. When the crystal substrate is cooled after crystal growth, the vapor phase atmosphere is made of hydrogen carrier gas and ammonia at a temperature of 700° C or above, and at the temperature of 700° C the gas is changed to only nitrogen gas. The crystal surface is subjected to heat deterioration when the substrate is cooled at 700° C or below, and after the crystal is cooled, the gallium nitride-based compound semiconductor layer is etched and removed. Since the atmosphere includes only nitrogen when the substrate crystal is cooled at 700° C or below, hydrogen gas is prevented from diffusing out of the crystal surface. After the cooling of the crystal, a desired structure is obtained only by etching the deteriorated crystal surface.



LEGAL STATUS

[Date of request for examination]	19.01.1996
[Date of sending the examiner's decision of rejection]	
[Kind of final disposal of application other than the examiner's decision of rejection or application converted registration]	
[Date of final disposal for application]	
[Patent number]	2872096
[Date of registration]	08.01.1999
[Number of appeal against examiner's decision of rejection]	